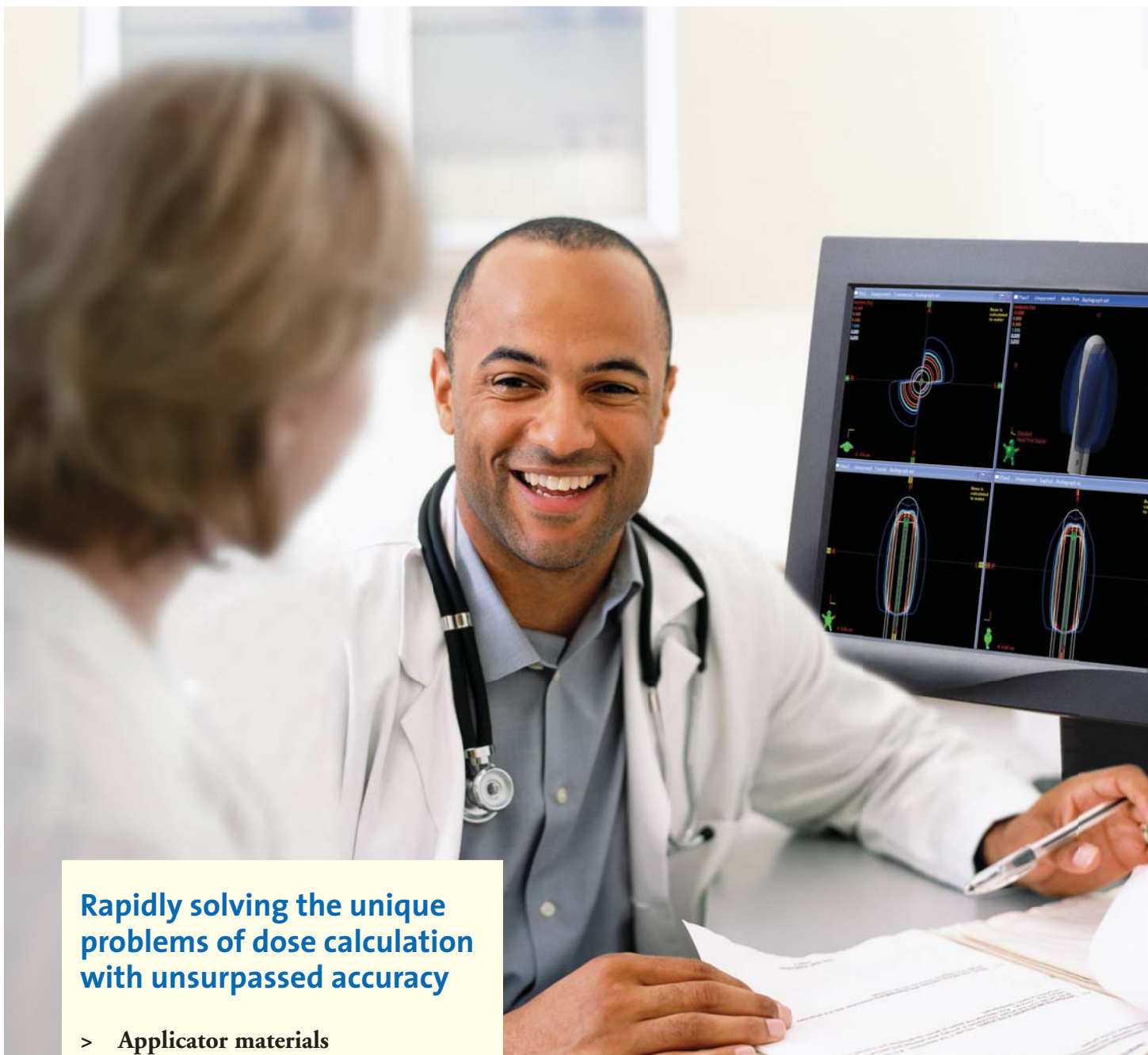


BrachyVision™ Acuros™ Advanced brachytherapy dose calculation
Accuracy in an instant



Rapidly solving the unique problems of dose calculation with unsurpassed accuracy

- > **Applicator materials**
- > **Patient inhomogeneities**
- > **Tissue air interfaces**

Solving the unique problems of dose calculation

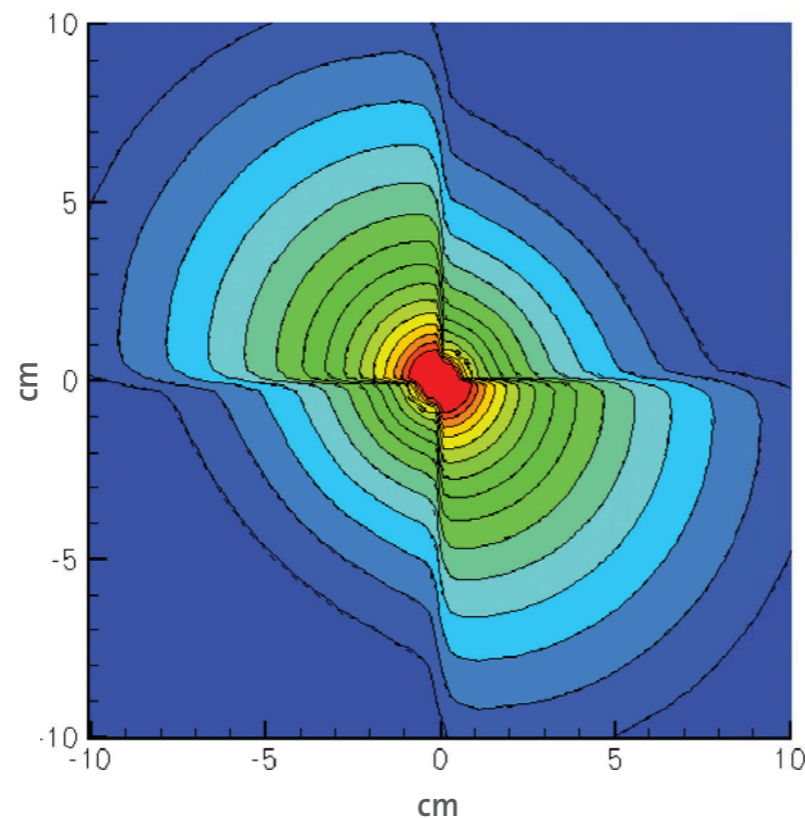
Acuros is an enhancement to the dose calculation abilities of BrachyVision. It brings new levels of precision and accuracy to your treatment planning in timeframes previously thought unimaginable.

What are the challenges of brachytherapy treatment planning?

Dose calculation for brachytherapy is generally calculated as if the sources are in water. In reality, a patient's anatomy contains many different densities such as bone and air which effect the actual dose distribution. Additionally, certain applicators incorporate shielding materials that attenuate the dose and are not accounted for in traditional planning systems.

Brachytherapy presents some unique dosimetric challenges due to steep dose gradients and the need for fast dose calculations. In addition, small volumes, like the urethra, require very detailed and precise spatial resolution.

Acuros can address these concerns in minutes making it a welcome addition to your planning.



How does Acuros compare to Monte Carlo?

(left) This chart compares the dose distribution generated with BrachyVision Acuros (solid line) versus Monte Carlo MCNPX (dashed line) using a shielded cylinder applicator in a 30x30x30 cm water phantom with a 2 mm output grid resolution. The root mean square difference (0.5 to 10 cm) is 1.18%. 2%/2 mm Distance to Agreement (DTA) criteria (0.5 to 10 cm) passed for 100% of voxels.

How does Acuros work?

Acuros is a Grid-Based Boltzmann Solver (GBBS). GBBS codes directly solve the Linear Boltzmann Transport Equation. It deterministically solves what Monte Carlo codes solve stochastically. Comparatively, Acuros more quickly provides the accuracy of Monte Carlo without the wait or statistical noise.

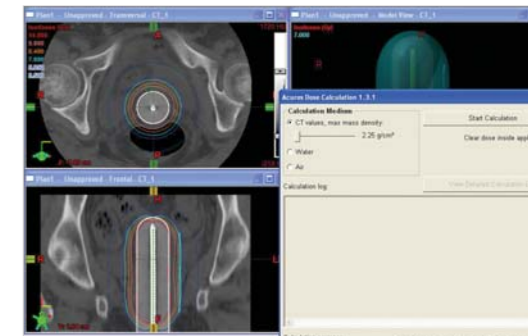
Initial plan generation and optimization are calculated using TG43. An inhomogeneity corrected plan is then requested. The user can select to use the CT data to account for variations in patient tissue. It is also possible to perform calculations based in water or air. While the calculation is being done, you can continue to use the workstation by creating new instances of BrachyVision.

BrachyVision is supplied with a library of Varian applicators. As well as allowing visualization of the surfaces and components of the applicator to aid placements, the library also contains details of the materials and composition of each applicator. This allows Acuros to perform a dose calculation with the correct attenuation based on the applicator properties whether images are available or not. This is particularly useful for plans that contain shielded applicators.

Acuros calculation times tend to average between 3 and 8 minutes depending on the applicator used. Comparatively, the same calculations could take hours or days in Monte Carlo.*

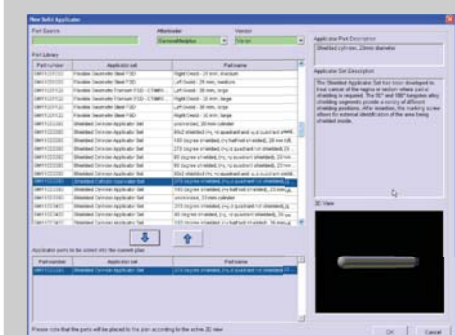
* Time calculation based on using a dual quad core processor PC using a CT image where both width and height 0.98 mm x 512 pixel = 50.176 cm with a Z-resolution 2.5 mm. The dose grid set to X= 100 x 0.3 cm = 30 cm, Y= 100 x 0.3 cm = 30 cm, Z= 84 x 0.25 cm = 21 cm (factor for Z-direction 2.5 mm/3 mm = 83.33). 25 source positions with a dwell time of 10 seconds each. Three solid applicator channels and a maximum mass density CT-value of 2.25 g/cm³.

Acuros supports all current Varian high dose rate (HDR) and pulsed dose rate (PDR) afterloaders.



Grounded in established methods respected by the radiation transport community

Acuros, developed by Transpire, Inc., is the second generation of the software application, Attila®. Working with the Los Alamos National Laboratory to commercialize and expand the technology, Attila is an established radiation transport software system with worldwide use in the areas of radiotherapy shielding design, fusion power research, and homeland security. Building on the Attila experience using methods adapted, re-architected, and optimized for brachytherapy dose calculations, BrachyVision Acuros redefines state-of-the-art brachytherapy dose calculations.



Applicator library speeds the 3D treatment planning process.

Easy to use

You don't have to learn the program to take advantage of Acuros' intelligence. Push a button and the calculations occur.



Mirroring planning to reality

As shown in the partial breast dose volume histogram above, Acuros allows radiation oncologists to view dose distribution where tissue boundaries exist.

Varian Medical Systems

Oncology Systems

3100 Hansen Way
Palo Alto, CA 94304-1038
Tel: 650.424.5700 | Tel: 800.544.4636
<http://www.varian.com>

For more information on BrachyVision Acuros, visit <http://www.varian.com/brachytherapy>.

USA Headquarters

California

Varian Medical Systems
Palo Alto, CA
Tel: 650.424.5700
800.544.4636
Fax: 650.493.5637
www.varian.com

BrachyTherapy Offices

USA

Varian Medical Systems
BrachyTherapy
Head Office
Charlottesville, VA
Tel: 888.666.7847
Fax: 434.244.7181

UK

Varian Medical Systems
UK Ltd.
BrachyTherapy
Crawley, West Sussex, UK
Tel: 44.1293.601.219
Fax: 44.1293.542.626

Germany

Varian Medical Systems
BrachyTherapy
Haan, Germany
Tel: 49.2129.551.0
Fax: 49.2129.551.55

USA Regional Offices

California

Varian Medical Systems
Corona, CA
Tel: 951.280.4401
Fax: 951.280.4300

Georgia

Varian Medical Systems
Marietta, GA
Tel: 770.955.1367
Fax: 678.255.3850

Illinois

Varian Medical Systems
Des Plaines, IL
Tel: 847.321.6810
Fax: 847.321.6811

New Jersey

Varian Medical Systems
Clark, NJ
Tel: 732.340.9346
Fax: 732.381.1060

European Headquarters

Switzerland

Varian Medical Systems
International AG
Zug, Switzerland
Tel: 41.41.749.8844
Fax: 41.41.740.3340

Austria

Varian Medical Systems
Gesellschaft m.b.H.
Voesendorf, Austria
Tel: 43.1.698.56.56
Fax: 43.1.698.56.59

Belgium

Varian Medical Systems
Belgium N.V./S.A.
Diegem, Belgium
Tel: 32.2.720.10.08
Fax: 32.2.720.77.07

Finland

Varian Medical Systems
Finland Oy
Helsinki, Finland
Tel: 358.9.430.771
Fax: 358.9.455.4585

France

Varian Medical Systems France
Buc, France
Tel: 33.1.30.83.83.83
Fax: 33.1.30.83.83.00

Germany

Varian Medical Systems
Deutschland GmbH
Darmstadt, Germany
Tel: 49.61.51.73130
Fax: 49.61.51.731313

India

Varian Medical Systems
India Pvt Ltd.
Mumbai, India
Tel: 91.22.26162301
Fax: 91.22.26162277

Varian Medical Systems
India Pvt Ltd.
Chennai, India
Tel: 91.44.28295970
Fax: 91.44.28295980

Italy

Varian Medical Systems
Italia, S.p.A.
Cernusco s/N (MI), Italy
Tel: 39.02.921.351
Fax: 39.02.921.35240

Netherlands

Varian Medical Systems
Nederland B.V.
Houten, Netherlands
Tel: 31.30.634.0506
Fax: 31.30.636.2466

Scandinavia

Varian Medical Systems
Scandinavia AS
Herlev, Denmark
Tel: 45.44.500.100
Fax: 45.44.500.190

Spain/Portugal

Varian Medical Systems
Ibérica, S.L.
Madrid, Spain
Tel: 34.91.33.44.800
Fax: 34.91.33.44.801

UK/Ireland

Varian Medical Systems
UK Ltd.
Crawley, West Sussex, UK
Tel: 44.1293.601.200
Fax: 44.1293.510.260

Asian Headquarters

Hong Kong

Varian Medical Systems
Pacific, Inc.
Kowloon, Hong Kong
Tel: 85.22.724.2836
Fax: 85.22.369.4280

China

Varian Medical Systems
China Ltd.
Beijing, P.R. China
Tel: 8610.8785.8785
Fax: 8610.8785.8960

Japan

Varian Medical Systems K.K.
Chuo-ku, Tokyo, Japan
Tel: 81.3.3639.9700
Fax: 81.3.3639.9623

Latin American Headquarter

Florida

Varian Medical Systems
Miami, FL USA
Tel: 305.929.1970
Fax: 305.929.1971

Brazil

Varian Medical Systems
do Brasil Ltda.
São Paulo, Brazil
Tel: 55.11.3457.2655
Fax: 55.11.3286.0034

Australian Headquarters

Australia

Varian Medical Systems
Australasia Pty Ltd.
Sydney, Australia
Tel: 61.2.9485.0111
Fax: 61.2.9485.0119

Varian, Varian Medical Systems, and GammaMed are registered trademarks, and BrachyVision, GammaMed*plus*, and VariSource are trademarks of Varian Medical Systems, Inc. The names of other companies and products herein are used for identification purposes only and may be trademarks or registered trademarks of their respective owners.
RAD 4141 Copyright © 2009 Varian Medical Systems, Inc. Printed in USA 4/09 (1.5M)